CLAIMS

1. A muffler for a motor vehicle provided on an exhaust gas passage of an engine installed on the motor vehicle, comprising:

a casing main body which is located most outside;

an exhaust gas introducing pipe constituting an end portion of the exhaust gas passage, including an extending portion extending into said casing main body and having a plurality of small holes in said extending portion;

a finisher located on an extending line of said exhaust gas introducing pipe and including an inner portion positioned inside said casing main body and an extending portion extending from said casing main body;

a silencer mechanism including expansion spaces and a constriction mechanism, wherein said expansion spaces are defined by pipe members arranged at specific intervals outside of a radial direction of said extending portion of said exhaust gas introducing pipe and said inner portion of said finisher; and

a valve mechanism provided on an end portion of said exhaust gas introducing pipe and communicating between said exhaust gas introducing pipe and said finisher when pressure of the exhaust gas in said exhaust gas introducing pipe exceeds a specific value.

2. A muffler for a motor vehicle according to claim 1, wherein:

said pipe members are constituted of a first inner pipe provided inside said casing main body at a specific interval and a second inner

pipe arranged inside said inner pipe at a specific interval wherein said exhaust gas introducing pipe and said finisher are inserted in both directions;

said expansion spaces are constituted of a first expansion space defined between said exhaust gas introducing pipe and said the casing main body, a second expansion space defined between said finisher and said casing main body, and a third expansion space arranged inside said second inner pipe and between said exhaust gas introducing pipe and said finisher;

said constriction mechanism is constituted of a first passage communicated between said first expansion space and said second expansion space, and a second passage communicated between said second expansion space and said third expansion space; and

said valve mechanism is communicated between said exhaust gas introducing pipe and said finisher via said third expansion space in an opening condition thereof.

3. A muffler for a motor vehicle according to claim 2, wherein said second passage is a space formed between said second inner pipe and said finisher.

4. A muffler for a motor vehicle according to claim 1 or 2, wherein said first passage is constituted of a first space defined between said inner pipe and said casing main body and a second space defined between said first inner pipe and said second inner pipe.

5. A muffler for a motor vehicle according to claim 4, wherein an acoustic material is arranged in an exhaust gas introducing pipe side of said second space.

6. A muffler for a motor vehicle according to claim 2 or 3, wherein said first passage is a space defined by said first inner pipe and said second inner pipe.

7. A muffler for a motor vehicle according to claim 6, wherein an acoustic material is arranged in a space defined between said first inner pipe and said casing main body.

8. A muffler for a motor vehicle according to claim 2 or 3, wherein said first passage is a space defined between said first inner pipe and said casing main body.

9. A muffler for a motor vehicle according to claim 8, wherein an acoustic material is arranged between said first inner pipe and said second inner pipe.

10. A muffler for a motor vehicle according to any one of claims 2 to 9, wherein said valve mechanism is constituted of a valve body movable so as to open and close the exhaust gas introducing pipe and an elastic member for pressing said valve body at a specific pressure to a closing direction.

11. A muffler for a motor vehicle according to claim 10, wherein a means for adjusting pressure for adjusting a fixed condition of said elastic member through said finisher from an outside is provided.

12. A muffler for a motor vehicle according to claim 10, wherein said valve body is formed in an approximately conical shape so as to expand to a downstream side of a flow direction of the exhaust gas and a top of said valve body is formed in a smooth round shape.

13. A muffler for a motor vehicle according to claim 1, wherein:

said pipe members are constituted of:

a first inner pipe which is arranged concentrically to said exhaust gas introducing pipe and having a downstream side closing bottom surface portion located at a downstream side of said small holes in an exhausting direction and fixed on a circumferential surface of said exhaust gas introducing pipe, said first inner pipe being a cylindrical with an opening in one side thereof;

a second inner pipe which is arranged concentrically to said exhaust gas introducing pipe and having an upstream side closing bottom surface portion located at an upstream side of said small holes in the exhausting direction and fixed on the circumferential surface of said exhaust gas introducing pipe and having a larger radius by a specific value than one of said first inner pipe, said second inner pipe being a cylindrical with an opening in one side thereof;

a third inner pipe which is arranged so as to overlap at a specific area to said first inner pipe, a downstream side end portion of said third

inner pipe being connected to said finisher, having a smaller radius by a specific value than one of said first inner pipe, said third inner pipe being cylindrical with openings both side thereof; and

a fourth inner pipe having a smaller radius by a specific value than one of said third inner pipe and arranged inside said third inner pipe, having an upstream side expanding radius portion whose front end is fixed on an inner surface of said first inner pipe, a downstream side expanding radius portion whose front end is fixed on an inner surface of said finisher, and downstream side exhausting holes formed on said downstream side expanding radius portion,

said silencer mechanism is constituted of:

a first passage defined by said first inner pipe and said second inner pipe and communicating to said small holes;

a first expansion space defined between said second inner pipe and casing main body, on which said first passage is opened;

a second passage defined by said first inner pipe and said third inner pipe and communicating to said first expansion space;

a third passage defined by said third inner pipe and said fourth inner pipe and communicating between said second passage and said downstream side exhausting holes; and

a second expansion space defined inside the fourth inner pipe, on which said downstream side exhausting holes are opened, communicating to an opening of said finisher.

14. A muffler for a motor vehicle according to claim 13, wherein said exhaust gas introducing pipe and said opening of said finisher are

communicated by opening of said valve mechanism.

15. A muffler for a motor vehicle according to claim 13 or 14, further comprising a fifth inner pipe arranged outside said second inner pipe and having a closing bottom portion closing between said second passage and said first expansion space and communicating between said first passage and said second passage, defining a fourth passage between said second inner pipe and itself, said fourth passage communicating between said first passage and said first expansion space.

16. A muffler for a motor vehicle according to claim 1, 2 or 3, wherein said valve mechanism has a valve body which is a convex shape that is projected to an upstream side of an exhausting direction, a spring pressing said valve body to an end side of said exhaust gas introducing pipe, and a mechanism for adjusting pressure by said spring.

17. A muffler for a motor vehicle according to claim 16, wherein said mechanism for adjusting pressure is constituted of a holding portion for holding one end of said spring and a rotation portion for moving said holding portion to said valve body to adjust pressure of the spring, said rotation portion being positioned on said extending line and being able to be adjusted from said opening of said finisher.

18. A muffler for a motor vehicle according to any one of claims 13 to 17, wherein said downstream side exhausting holes are formed at specific intervals on a circumferential surface of said downstream side

expanding radius portion of said fourth inner pipe.

19. A muffler for a motor vehicle according to any one of claims 13 to 18, wherein each of said downstream side exhausting holes is a square hole, an upstream side of said downstream side exhausting holes being opening to a third passage side.

20. A muffler for a motor vehicle according to any one of claims 13 to 18, wherein each of said downstream side exhausting holes is a streamline shaped hole, an upstream side of said downstream side exhausting holes being opening to a third passage side.

21. A muffler for a motor vehicle according to any one of claims 13 to 20, wherein a small expansion space is formed between said downstream side closing bottom surface portion of said first inner pipe and said upstream side closing bottom surface portion of said second inner pipe.

22. A muffler for a motor vehicle according to claim 1, wherein said pipe members are constituted of

a first inner pipe provided at a specific interval inside said casing main body,

a second inner pipe provided at a specific interval inside said first inner pipe, and

a third inner pipe provided at a specific interval inside said second inner pipe and defining a first passage;

said silencer mechanism is constituted of spaces defined by said casing main body, said first inner pipe, said second inner pipe and third inner pipe.